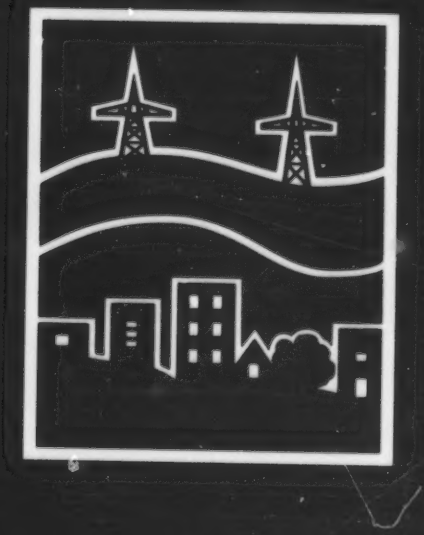
Bipole III Transmission Line
Henday-Riel

Alternative Corridors Status Report



Conawapa to Winnipeg
Power Transmission Complex

manitoba hydro

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Manitoba Hydro's Development Plan

Manitoba Hydro is currently pursuing a number of long-term capital investment and conservation initiatives. These are intended to meet projected consumer needs into the next century and to improve the security and reliability of the province's electrical system.

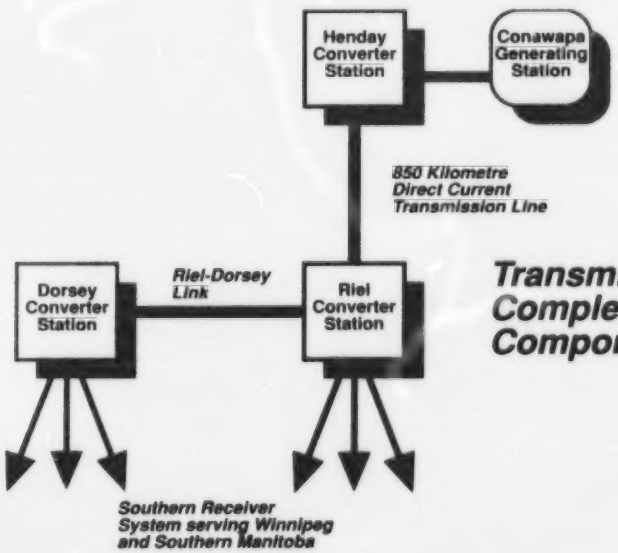
Part of Hydro's capital plan is to build the 1390 megawatt Conawapa Generating Station on the Nelson River, downstream from the soon-to-be-completed Limestone project. This facility will generate needed power for both projected demand within Manitoba and committed sales to Ontario and the United States.

Also proposed is development of the Conawapa-Winnipeg Power Transmission Complex, known technically as the Bipole III Complex.

The Conawapa-Winnipeg Power Transmission Complex

This major development includes five interrelated transmission and conversion facilities:

- An upgrade of the existing Henday Converter Station on the Nelson River;
- An estimated 850-kilometre HVDC (High Voltage Direct Current) Transmission Line from Henday to Winnipeg, known as Bipole III;
- A new converter station east of Winnipeg, known as Riel Converter Station;
- A transmission link between Riel and the existing Dorsey Converter Station northwest of Winnipeg; and
- Upgrades to Hydro's high voltage 230 kilovolt (kV) Southern Receiver System serving Winnipeg and southern Manitoba.


Henday Converter Station
Conawapa Generating Station
850 Kilometre Direct Current Transmission Line
Dorsey Converter Station
Riel-Dorsey Link
Riel Converter Station
Southern Receiver System serving Winnipeg and Southern Manitoba

Transmission Complex Components

Purposes

This Transmission Complex has three purposes:

- To convey Conawapa or other northern power to Hydro's receiving system in southern Manitoba;
- To increase the flexibility of Hydro's transmission network during normal operations; and
- To improve Hydro's capacity to service its customers in the event that part of its network is disrupted by an outage or by maintenance requirements.

The Bipole III Alternative Corridors Study

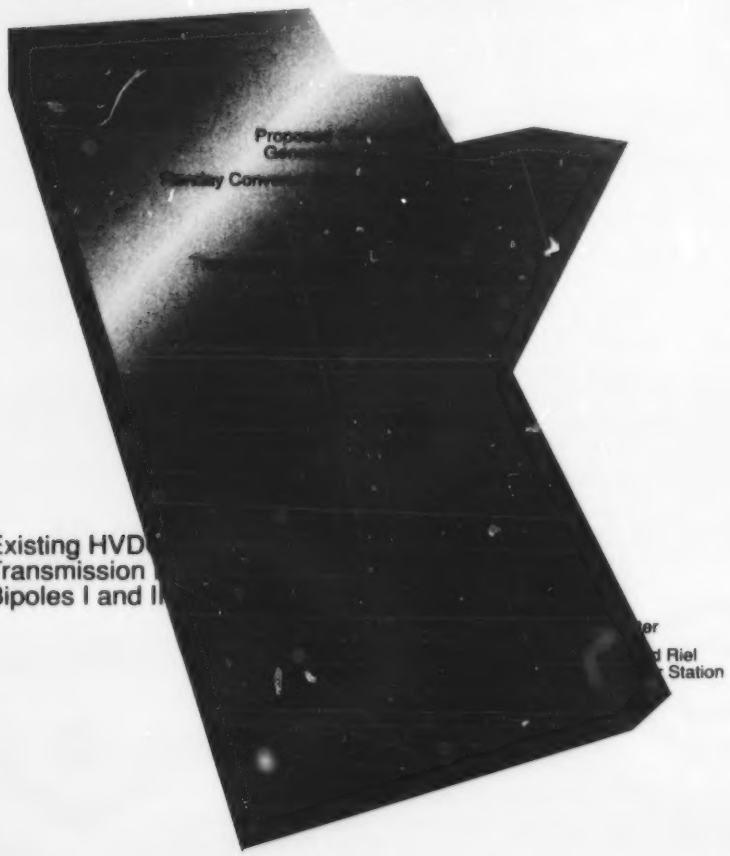
Route selection and environmental assessment for the Bipole III transmission line component of the complex is being undertaken in two stages. This booklet describes work done to date on the corridor selection stage. Selection of a specific route within the preferred corridor and detailed environmental impact studies will occur in the second stage, once the preferred corridor has been finalized and approved.

Careful route selection is an effective way of avoiding or minimizing the potential adverse effects of transmission line development. The two stage process is designed to take maximum advantage of this opportunity. In stage one work over the past year, Manitoba Hydro and its consultants have examined the study area both to determine siting opportunities and to map features which would best be avoided by the transmission line. This regional screening process has resulted in identification and evaluation of five alternative transmission line corridors between

Henday on the Nelson River and Winnipeg. Each corridor is typically between five and ten kilometres in width and is capable of accommodating several alternative routes. For this HVDC line, routes are defined as rights-of-way that are 76 metres in width.

Hydro has concluded that the most desirable corridor options are generally located east of Lake Winnipeg. In this area, three alternative corridors were identified and evaluated. One has been tentatively selected as the preferred corridor. During the course of first stage analysis and public consultation, and prior to formal application for its approval, the boundaries of this corridor will be further refined. It is possible, for example, that final definition of the corridor might be adjusted to incorporate some of the desirable characteristics of the other east side alternatives.

Two other potential corridors were examined, one located west of Lake Winnipeg and another combining segments east and west of the lake. Both were considered less desirable than the east side options and are thus not recommended for further study. This booklet describes how and why the above judgments were made.



Public Review and Consultation

This status report provides an information base for public and community consultation on the proposed HVDC corridor. More detailed information will be available from Hydro's Environmental Management Division as the study proceeds.

Beginning in the fall of 1991, Hydro's representatives will hold a series of community open houses and other meetings in northern and southern Manitoba to discuss Hydro's corridor evaluation. Manitoba Hydro welcomes public discussion and comment on its analysis and conclusions. Band and non-treaty residents, property holders, government officials, environmental groups, and other interested parties are invited to participate.

Feedback received during these meetings will assist Hydro in its preparation of the final Corridor Selection Study to be submitted to provincial and federal environmental review authorities in early 1992.

The Bipole III Transmission Line

Delivery of power from the proposed Conawapa Generating Station will require a new ±500 kilovolt (kV) High Voltage Direct Current (HVDC) transmission line to Winnipeg, known as Bipole III.

This line will extend some 850 kilometres between the existing Henday Converter Station on the Nelson River and the proposed Riel Converter Station east of Winnipeg. Current plans call for Bipole III to be in operation in the year 2000.

Role within Hydro's Transmission Network

At present, two HVDC lines (Bipoles I and II) run some 900 kilometres in length, west of Lake Winnipeg, to deliver power from generating stations on the Nelson River to the Dorsey Converter Station northwest of Winnipeg. There the power is converted to alternating current and is distributed to domestic users and export markets via the Southern Receiver System and interconnections with utility systems in other jurisdictions.

An additional transmission line connection — Bipole III — is required to increase transmission capacity. As well, the new line will fulfil two important additional roles:

- To improve the reliability of the HVDC system, by avoiding potential service disruptions in the event that the existing bipoles are out of service; and
- To improve the system's overall security, by separating Bipole III from the two existing bipoles to reduce the system's vulnerability to multiple failure due to a single event, such as an airplane crash, forest fire, or adverse climatic conditions.

Delivery of power to southern Manitoba is becoming increasingly dependent on the Dorsey Station. Prior to the present development of Limestone Generating Station, approximately 55% of Hydro's generating capacity had been supplied to Dorsey along a single right-of-way shared by Bipoles I and II. Although potentially vulnerable to a major accident or other disruption, this geographic concentration of delivery facilities has been manageable because Hydro has had sufficient alternative capacity to adjust the flow of power through other sources and system interconnections.

However, the situation will change with completion of Limestone, and would change further after Conawapa is in service, if the new Bipole III were located in close proximity to the present concentration of facilities. With the location of Bipole III in the same corridor as Bipoles I and II, about 80% of system generating capacity would be vulnerable to a single accidental or natural event that could disrupt all the facilities. In other words, major long term power outages could result.

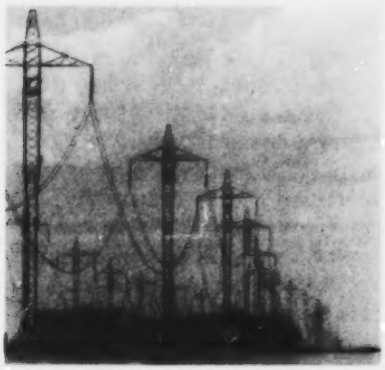
System Security

While HVDC transmission lines are designed to withstand severe weather conditions and other unusual events, they are vulnerable to catastrophes such as tornadoes and major ice storms, forest fires, and aircraft crashes. Although infrequent, these events can have such major consequences that they justify risk reduction measures.

The simplest of these measures, where practical, is physical separation of facilities in order to minimize the risk of multiple line failure caused by a single event. The greater the separation, the lower the risk. Statistical analyses have indicated, for example, that a 20 kilometre separation between transmission lines would substantially reduce the risk of a tornado damaging both lines simultaneously. Greater separation would also reduce the risk of multiple facility disruptions from regional events like forest fires or major ice storms.

Project Design

Final engineering design for Bipole III will begin following second stage route selection and approval and will be completed by 1995. However, this new line is expected to be similar to other existing HVDC lines that consist of two metallic conductors strung from steel towers, typically 45 to 50 metres in height and spaced 350 to 490 metres apart. On Bipole III, guyed towers will tend to be used in undeveloped, non-agricultural areas; self-supporting structures will typically be installed elsewhere.



The guyed towers used on the Bipole I and II transmission lines, shown here, are similar to the towers that would be used on the proposed Bipole III line.

Right-of-Way Requirements

Bipole III will typically require an unobstructed strip within the right-of-way, approximately 60 metres in width, to avoid any potential interference with the conductors and to facilitate ongoing maintenance.

Depending on the particular location, the line likely will have to cross a combination of Crown, local government, and privately-owned property. In general, Hydro's policy is to obtain needed rights-of-way by means of easement agreements, Crown land reservations, permits, or other similar instruments, rather than outright purchase. The use of existing Hydro rights-of-way, especially in southern Manitoba, is preferred wherever viable.

The corridor alternatives presently identified by Hydro avoid Indian Reserves and established land claim settlement areas. In the event that reserve land were required, however, Hydro would obtain the appropriate band council resolution and, if necessary, federal government approvals. As well, Hydro will consult with aboriginal people about corridors traversing "hold areas," potential land claim areas and traditional resource use areas.

Line Clearing and Construction

Once the preferred corridor is approved, more detailed analysis of terrain, soils, water crossings, property ownership patterns and biophysical characteristics will determine to a large extent where the specific Bipole III route will be located. Cutting of the right-of-way centreline is scheduled to begin in the fall of 1996, followed by clearing within the right-of-way.

Construction will then take place, including establishment of tower foundations, guy wire anchors where applicable, tower assembly and erection, and conductor stringing. Development of the northern portion of the line will occur in winter months to facilitate access and reduce the possibilities for negative environmental impacts. In the south, construction may continue in other seasons, subject to agricultural constraints.

Following approval of the corridor, more detailed investigations will be made in potentially sensitive areas, such as water crossings, to pinpoint the best possible location for Bipole III.

Environmental Impact Issues

Use of constraint criteria to locate potential corridors in this initial stage is designed to avoid environmental impacts at the regional level. During Hydro's second stage identification and evaluation of a specific route for Bipole III within the preferred corridor, a more detailed environmental impact assessment will be prepared.

This assessment will cover potential project impacts of a physical, biological, social, cultural, and economic nature. Effects on terrain, agricultural operations, drainage, water bodies, seasonal wildlife movements, and habitats for flora and fauna will be assessed, as will the prospect of any new resource pressure arising from the development. The subject of electric and magnetic fields also will be addressed. Suitable measures and programs will be identified to mitigate potentially adverse impacts, and to enhance positive impacts of the project.

Employment and Business Opportunities

Development of the Bipole III transmission line will create an estimated 8,600 person-months of direct employment, or about 1,450 jobs.

Hydro intends to issue contracts for line clearing and construction. In northern Manitoba, preferential hiring, work packaging, tendering, and purchasing policies will be implemented to ensure that aboriginal and other northern residents have access to project-related employment and business opportunities. Hydro will provide a detailed statement of its hiring and procurement plans for the Conawapa-Winnipeg Power Transmission Complex during public consultation throughout the fall of 1991.

While substantial local employment and business opportunities are expected, Bipole III will not yield long-term economic development benefits to the region through which it runs. Being a direct current line, there will be no opportunity for intermediate "taps" of electricity off the line to serve area resource development or communities.

Aboriginal and other residents of Northern Manitoba will benefit from preferential hiring, work packaging, tendering and purchasing during clearing and construction of the transmission line.

Effect on Wilderness Areas and Aesthetics

Hydro does not need, nor does it intend to develop an all-weather access road for construction or operation of Bipole III. However, the project will introduce a linear right-of-way in forested areas that now have few year-round overland corridors.

This new access will increase the potential for local winter travel via snowmobiles or all-terrain vehicles in territory that previously was inaccessible or little used. Such new access has the potential to lead to increased use and development of resources, depending on their relative attractiveness and the demand for them.

The permanent intrusion of man-made structures and a cleared right-of-way in an otherwise natural environment may also have an unavoidable impact on the visual quality of the area. This loss of aesthetic enjoyment may be particularly felt by local populations and visitors, those whose economic livelihoods are dependent on these environments, and those committed to special protection of highly valued landscapes, including Canadian Heritage Rivers and wilderness parks.

Electric and Magnetic Fields

As with any electrical equipment, electric and magnetic fields (EMF) will occur along the transmission line. To date, the weight of scientific evidence on this subject has not established any cause-effect link between EMF exposure and adverse effects on human health. In recognition of the public's concern, Hydro will continue to measure and predict EMF levels at its own facilities, to conduct its own EMF research, and to monitor world-wide scientific studies on the subject.

If ongoing research provides scientific evidence that indicates a need to modify existing practices, Hydro will take whatever prudent measures are required to protect public and employee health and safety.

Measures will be taken during project design to mitigate the potential for electronic interference from EMF.

Land Use and Property Impacts

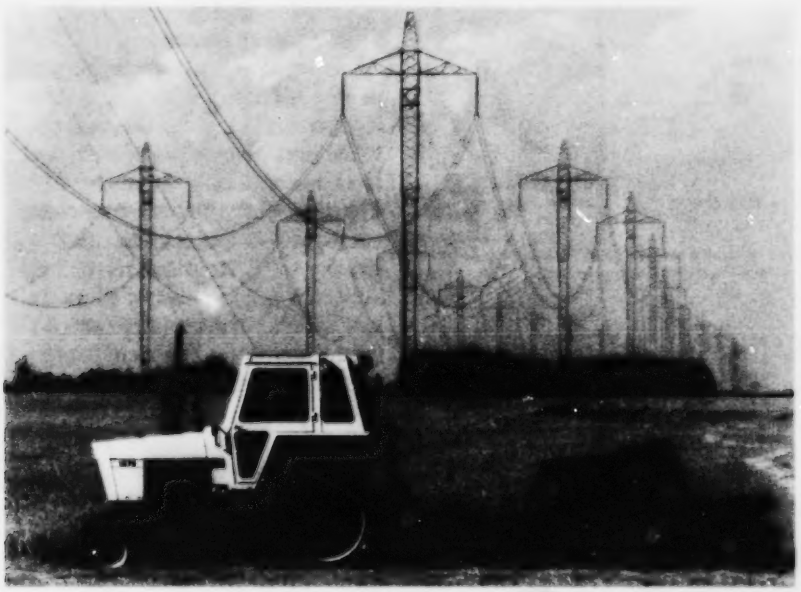
During the corridor selection stage, a general effort will be made to avoid residential communities and other particularly sensitive land uses. More detailed land use and property impacts will be addressed during route selection. Where necessary, and where opportunities to avoid sensitive uses are physically limited, mitigation measures will be developed.

Impact Management

The first stage corridor selection process will facilitate subsequent selection of a specific route to avoid sensitive biophysical and socio-economic features. If avoidance is not possible, undesirable effects will be minimized through use of measures such as buffer zones, selective clearing, site restoration, careful tower siting, and controlled access.

An environmental impact statement will be prepared outlining the measures Hydro will take to minimize potential adverse impacts of clearing, construction, and operation. These will include such matters as right-of-way maintenance, transmission line inspection and repair, and responses to emergencies. Hydro and its contractors will comply with all applicable regulations and industry codes to protect the environment.

An environmental impact assessment will identify possible effects of a physical, biological, social, cultural and economic nature, including agricultural operations.



The Study Area

To identify potential corridors, a large study area was established, composed of four zones, east and west of Lake Winnipeg.

The Northern Zone

The northern zone is typical of the rugged and sparsely populated Precambrian Shield. There are numerous water bodies, rock outcrops, and low-lying wet areas; scattered zones of permafrost; extensive forest and valuable fish and wildlife habitat. All-weather road access is limited. Local economies are dependent on trapping, fishing, hunting, and other forms of natural resource use. Much of the land is owned by the province.

The East Side Zone

The east side of Lake Winnipeg, like the northern zone, lies within the Precambrian Shield. North of the Wanipigow River, there are extensive areas of wilderness, including Atikaki Provincial Wilderness Park. The area contains a rich diversity of boreal forest vegetation and wildlife habitat, several major river systems, and localized zones of permafrost. Access is limited.

The area's few aboriginal settlements rely on trapping, fishing, some wild rice harvesting, tourism and logging. South of the Wanipigow River, population and land uses gradually intensify. Clusters of urban development are interspersed among areas used extensively for tourism, recreation, agriculture, and forestry. Nonetheless, much of the territory east of Lake Winnipeg remains in provincial ownership.

In general, the eastern part of the study area, with its more regionally variable biophysical features, is less extensively studied than the area west of the lake.

The West Side Zone

The west side of the lake lies within the Manitoba Lowlands where the topography ranges from flat to gently rolling and hummocky. The area is bounded by large lakes — Cedar, Winnipegosis and Winnipeg. Only a narrow band of land at Grand Rapids separates the upper basin of Lake Winnipeg from Cedar Lake and Lake Winnipegosis. This area now contains Bipoles I and II and offers limited options for meeting the physical separation and system security requirements associated with development of Bipole III.

North of Gypsumville, this zone contains diverse habitat for flora and fauna. Settlement is sparse despite all-weather road access through the area. Commercial fishing is a key industry. Portions of the zone are proposed for forestry operation. Some quarrying occurs near Gypsumville. South of this community, settlement and land uses (agriculture, tourism, recreation) gradually intensify, interspersed by wildlife habitat.

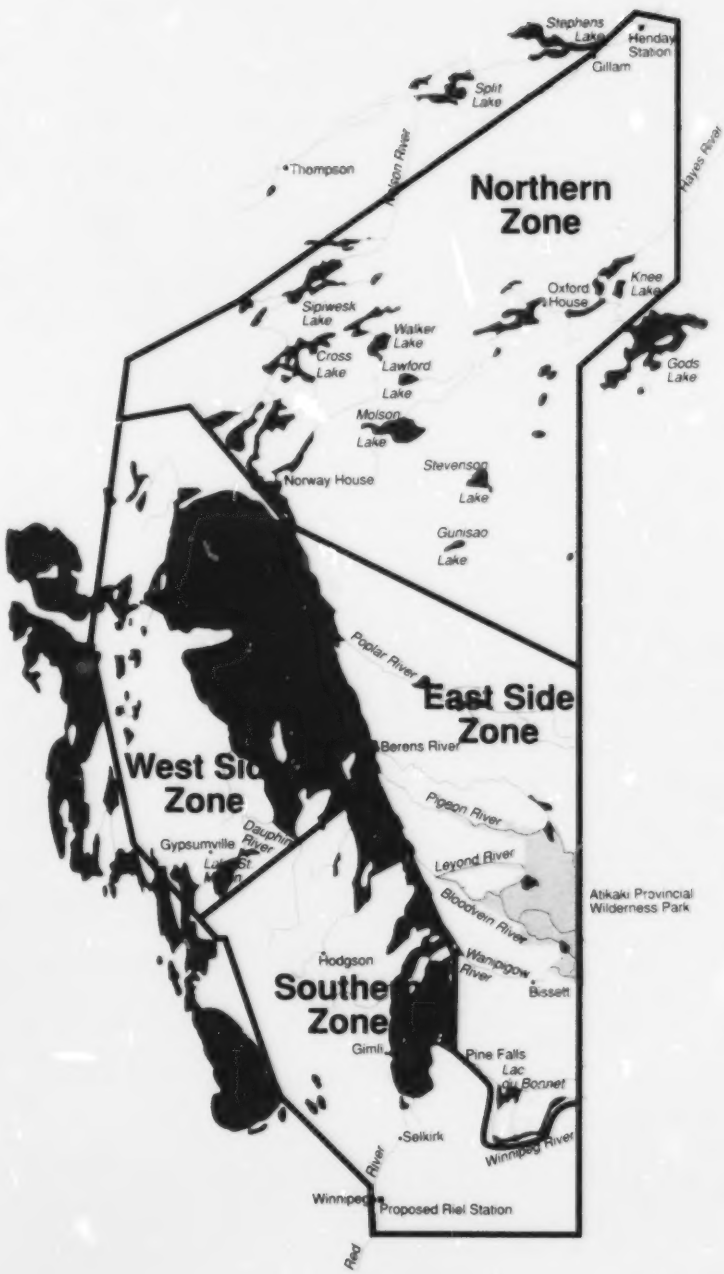
The Southern Zone

The southern zone, both east and west of Lake Winnipeg, is characterized by denser population, more intensive land uses, diverse biophysical conditions, complex transportation networks, accessible public services, and fragmented property ownership.

Agricultural activity, with its corresponding grid network of roads and farmsteads, dominates the area west of Pine Falls and south of the Winnipeg River (east of the lake) and the area south of Gypsumville west of the lake. The area east of Pine Falls and south of the Winnipeg River is largely occupied by provincial forests and Whiteshell Provincial Park.

Lakeshore areas are progressively more developed for cottage and recreational purposes as one moves south through the zone. There is also a more fragmented pattern of property ownership relative to the prevalence of provincial land in the north.

The extreme southern section contains the Winnipeg metropolitan area and related urban and suburban infrastructure.



Three groups of criteria were used to identify corridors within the study area. These same criteria were then used to compare the relative advantages and disadvantages of the various options.

Functional, Technical, and Economic Requirements

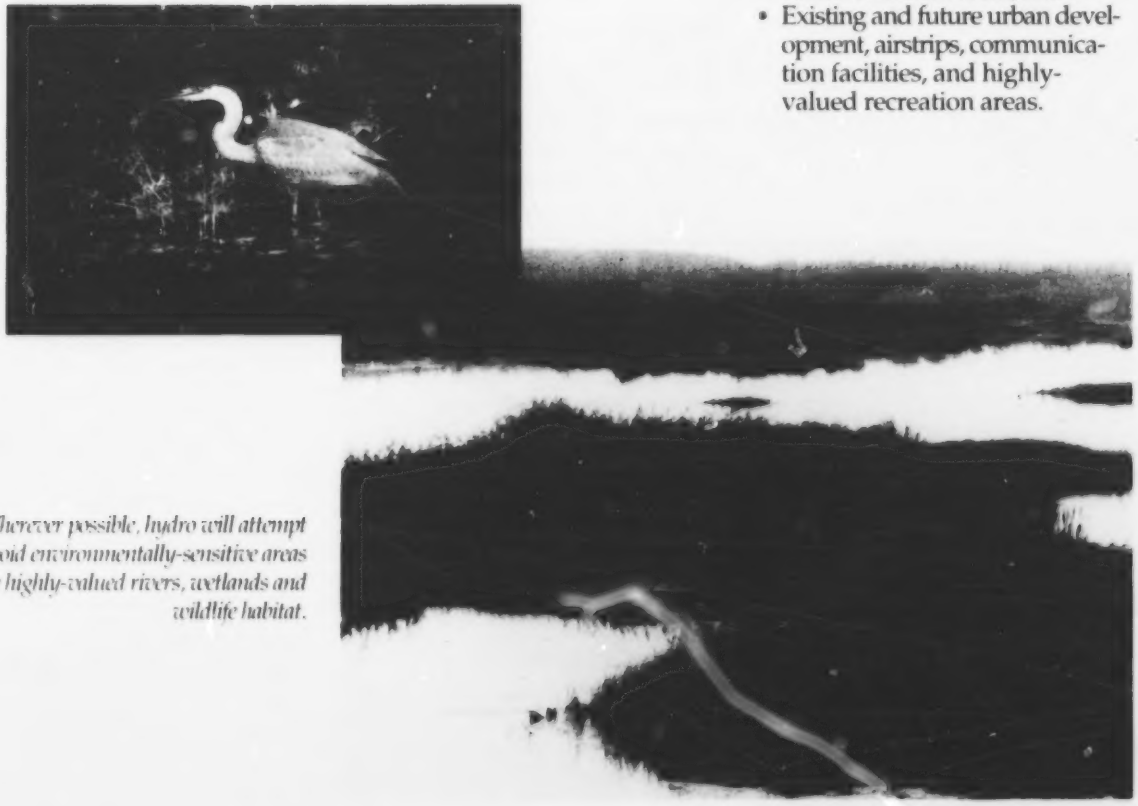
A set of functional, technical, and economic requirements has been established for an acceptable transmission line corridor, including:

- System security;
- Avoidance of large water crossings wider than 600 metres;
- Avoidance, where possible, of unconventional or unusually costly engineering or construction methods; and
- Minimum overall costs.

Biophysical and Socio-economic Constraints

Biophysical and socio-economic constraints that define areas to be avoided, if possible, were identified. They include:

- Highly valued and sensitive rivers, wetlands, and wildlife habitat;
- Specially designated wilderness parks, heritage rivers, and areas being marketed as "wilderness experience" areas;
- Indian Reserves, established land claims, Northern Flood Agreement hold areas, and potential claim settlement areas; and
- Existing and future urban development, airstrips, communication facilities, and highly-valued recreation areas.

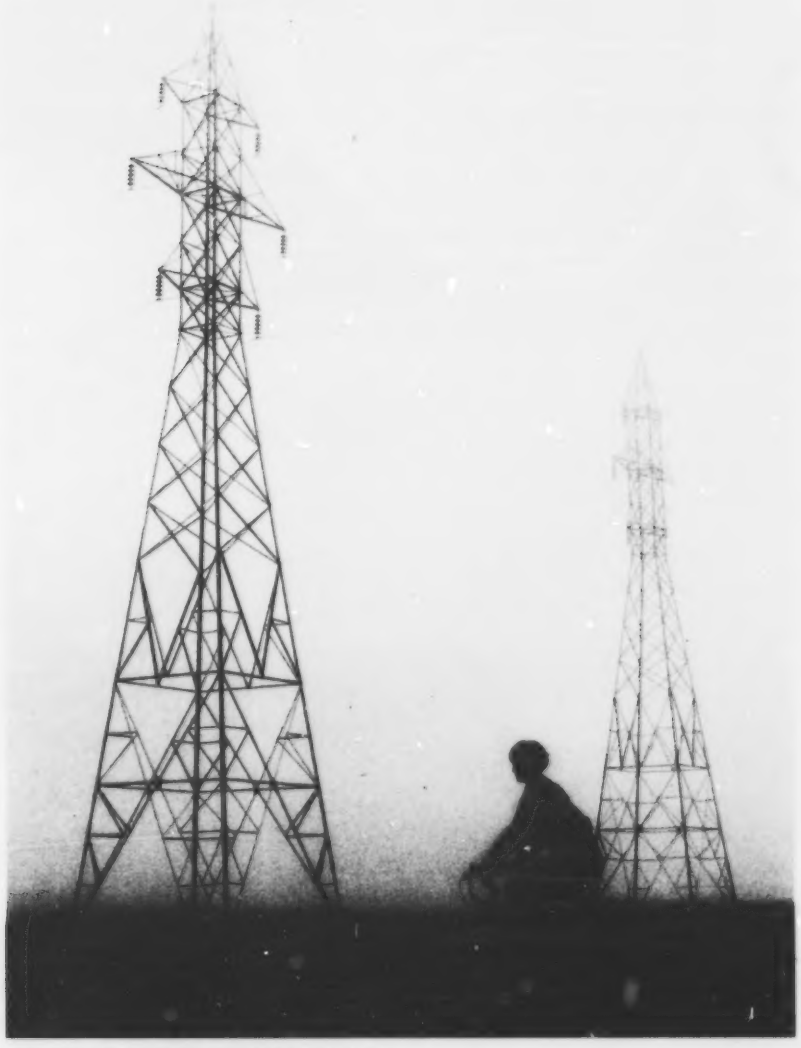


Wherever possible, hydro will attempt to avoid environmentally-sensitive areas like highly-valued rivers, wetlands and wildlife habitat.

Special Siting Opportunities

Areas offering special opportunities for corridor siting were also identified, such as:

- Joint use of existing transmission line rights-of-way and, in some instances, roads, railways and winter roads;
- Recent forest fire burn areas, typically avoided by caribou in the short term;
- High dry areas with exposed bedrock, suitable for tower foundations;
- Permitted logging areas already or potentially subject to disturbance; and
- Areas within five kilometres of gravel and sand deposits potentially usable for construction purposes.



Running the new line parallel to existing transmission lines, as seen in the photograph, may offer an opportunity to reduce impacts.

Applying the corridor siting criteria, five discrete corridor alternatives have been identified and named: Uplands, East Shoreline, Atikaki By-pass, West Side and Narrows Crossing.

The greatest single influence on the corridor identification process was the presence of Lake Winnipeg and a number of other large lakes. Lake Winnipeg divides the study area into eastern and western halves. To the west, the bottleneck between Cedar Lake and Lake Winnipeg severely constrains corridor options in the vicinity of Grand Rapids. Northeast of Lake Winnipeg, several chains of lakes limit the number of possible north-south corridor alignments because of their size and general orientation.

*Common Features**

All five corridors share the same kinds of conditions, crossing to varying degrees:

- Known woodland caribou range;
- Known moose over-wintering habitat/concentration areas;
- Highly-valued waterfowl habitat other than designated wetlands;
- Streams and rivers which likely contain fish spawning habitat;
- Relatively inaccessible wilderness in the north-eastern part of the study area;
- Land used for agricultural purposes;
- Known highly-valued recreational areas;
- Productive trapping areas; and
- Traditional aboriginal resource areas.

**A map, at 1:1,000,000 scale, showing the key features described in this report and the location of the five alternative corridors, is available on request from Manitoba Hydro at the address indicated on page 22.*

All corridors, again to varying degrees, avoid or make it possible to avoid:

- Designated Manitoba heritage wetlands;
- Known rare and endangered wildlife habitat;
- Known elk and deer overwintering habitat/concentration areas;
- Provincial parks (although the West Side corridor crosses a study area for the proposed Little Limestone Caves park reserve);
- Indian Reserves and established land claims;
- Known potential land claims or claim settlement areas;
- Existing communities;
- Areas designated for future urban development;
- Airstrips and float plane bases; and
- Communication facilities.

Although Bipole III and its project components largely avoid the Winnipeg urban area, certain transmission corridor alternatives involve proximity to suburban and rural residential concentrations north and east of the City. West side alternatives, for example, would require a new corridor crossing of the Red River near suburban subdivision development.

Interpretation of aerial photographs is one of several methods used to locate the five alternative corridors for Bipole III.

Three of the five alternatives (Uplands, East Shoreline and Atikaki By-pass) are located on the east side of Lake Winnipeg. A fourth (West Side) is west of the lake. The fifth (Narrows Crossing) represents a composite of the northern portion of two of the east side alternatives and the southern part of the west side alternative.

Uplands

The Uplands option is the shortest and straightest of the five options. This corridor runs southward from Henday Converter Station to what is believed to be an acceptable crossing point of the Hayes River, near Oxford House.

Proceeding south, it takes a path either east or west of a series of large lakes, to a point east of Stevenson Lake. It proceeds east of Gunisao Lake, then south to crossings of the Pigeon, Leyond, and Bloodvein Rivers on the western edge of Atikaki Provincial Wilderness Park. At this point, the Uplands corridor follows one of two branches to avoid Wanipigow Lake, providing options for crossing the Winnipeg River north or south of Lac du Bonnet and then continuing to Winnipeg.

Evaluation

Of the five alternatives, Uplands could have the greatest potential impact on the biophysical environment. It is the only option that crosses Atikaki Wilderness Park, plus two heritage rivers — the Hayes (proposed) and the Bloodvein.

It also passes through known woodland caribou habitat; one branch passes through the winter range of the southern-most woodland caribou herd in Manitoba. Moose over-wintering habitat is also crossed. A number of lodges and outfitters operate in areas along this corridor. As in the case of other east side corridors, the crossing of the Winnipeg River also would involve potential impacts on a highly-valued recreation resource.

At the same time, Uplands is the shortest and has the lowest construction cost of all identified options. It minimizes the crossing of the known woodland caribou range immediately south of the Nelson River and, of the three east side alternatives, entails the least intrusion on the Berens River International Biological Program Site.

East Shoreline

This corridor shares the Uplands alignment for the first 90 kilometres south of Henday. It then can follow one of two branches. One runs southwest toward Molson Lake, crossing the Hayes at a point close to that river's potentially sensitive headwaters. The second follows the Uplands alignment to the Hayes, then turns southwesterly to join the other branch east of Molson Lake. A single corridor then proceeds across the Poplar River and southward along a path slightly removed from the east shore of Lake Winnipeg. The alignment parallels an existing 66 kV transmission line and winter road. It also crosses the Bloodvein River at a point outside the designated Canadian Heritage River section. South of the Wanipigow River, the corridor joins the western branch of the Uplands option.

Evaluation

In contrast to Uplands, East Shoreline presents opportunities to avoid Atikaki Park, the designated heritage section of the Bloodvein River, and considerable woodland caribou range, especially in the region south of the Poplar River. It also traverses recent burn areas, and parallels an existing transmission line right-of-way and a winter road.

At the same time, the East Shoreline option, like Uplands, crosses areas marketed as wilderness experience and used by outfitters. It also impinges on the Winnipeg River recreation area. Of the five alternatives, it appears to involve risk of potential land use conflict with more northern settlements.

In addition, East Shoreline involves areas that are relatively flat and poorly drained. While entailing less bush clearing, construction could be more costly than the other east side options because of these conditions and resultant additional tower foundation costs, and if special engineering measures are required relative to ice storms which may be more serious along the lake shore.

Atikaki By-pass

This alternative is essentially a compromise between the Uplands and East Shoreline corridors. After sharing the Uplands alignment from Henday to approximately Gunisao Lake, this option extends southwest to an area near the mouth of the Pigeon River where it connects with the East Shoreline corridor.

Evaluation

Atikaki By-pass avoids crossing the Atikaki Provincial Wilderness Park.

By following the northern segment of the Uplands option to the Gunisao Lake area, Atikaki By-pass crosses the proposed Hayes Heritage River at what is considered to be an acceptable point near Oxford House. Like Uplands, it traverses less of the known woodland caribou range immediately south of the Nelson River than the westernmost branch of the East Shoreline option. In the area south of the Poplar River, however, it traverses more caribou range than East Shoreline. Like Uplands, Atikaki By-pass may offer some technical and financial benefits for tower siting and construction, due to the predominantly low-relief, hummocky terrain with exposed bedrock.

In their common segments south of the Pigeon River, Atikaki By-pass shares many of the East Shoreline corridor advantages and disadvantages.

West Side

A West Side corridor has been identified to the south and east of the existing Bipoles I/II right-of-way, and located to permit minimally acceptable separation.

Two possible branches have been identified from Henday: one shares the Uplands option for a short distance, then extends southwest to traverse Cross Lake south of Sipiwesk Lake; the other extends southwest to Lawford Lake, incorporating an existing winter road south of Walker Lake, then joins the first branch northeast of Norway House. A wide common corridor proceeds around the north end of Lake Winnipeg. It then narrows considerably, running south past Grand Rapids and Lake St. Martin into the Interlake region and on to Winnipeg.

To achieve minimally acceptable separation between HVDC lines at the Grand Rapids bottleneck, Bipole I would have to be realigned some 20 kilometres to the west, as indicated in the accompanying map. This relocation would permit installation of Bipole III on the existing right-of-way with Bipole II. To do so, however, would entail costly engineering and construction measures, involving the use of higher towers, natural and perhaps artificial islands in Cross Bay on Cedar Lake.

Evaluation

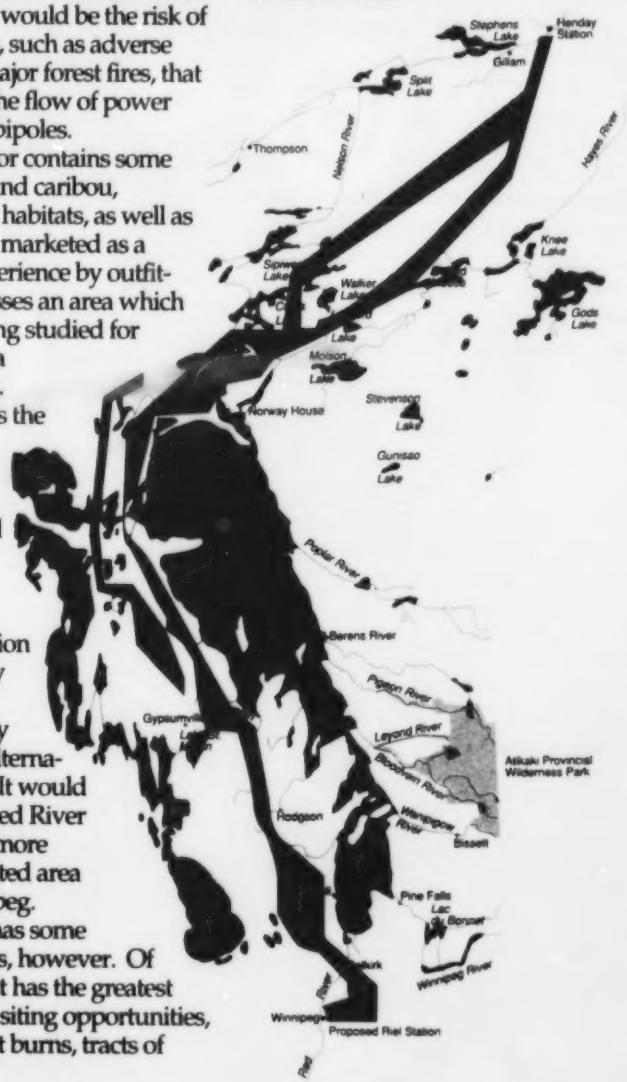
The West Side alternative is the least desirable option from the standpoint of system security. It also has significant financial disadvantages due to its greater length, higher costs, and complexity of design and construction in the Grand Rapids area. Manitoba Hydro currently estimates that this alternative could cost in the order of $200 million (year 2000 dollars) more than the east-side alternatives.

While physically separated from the existing two bipoles, the West Side option provides only modest protection against a local event that could result in a common failure of all three HVDC lines. Still present as well would be the risk of regional events, such as adverse weather and major forest fires, that could disrupt the flow of power along all three bipoles.

This corridor contains some known woodland caribou, moose, and elk habitats, as well as areas used and marketed as a wilderness experience by outfitters. It also crosses an area which is currently being studied for designation as a provincial park.

West Side is the only option that does not entirely avoid Northern Flood Agreement Hold Areas. It also requires greater acquisition of rights-of-way over privately owned property than do other alternative corridors. It would also require a Red River crossing in the more densely populated area north of Winnipeg.

West Side has some positive features, however. Of all the options, it has the greatest potential to use siting opportunities, including recent burns, tracts of territory allocated to logging, and existing linear infrastructure. The West Side avoids Canadian Heritage rivers and biological program sites, and encounters relatively few ecologically significant areas. In the case of the Dauphin River crossing east of Lake St. Martin, it permits selection of specific line routes that would avoid particularly sensitive sites.



Narrows Crossing

This alternative, using a crossing of Lake Winnipeg at the Narrows south of Bloodvein Bay, essentially combines the northern part of either the East Shoreline or Atikaki By-pass option east of the lake with the southern portion of the West Side alternative. In this way, the Narrows option avoids the Grand Rapids bottleneck.

Several alternative routes across the Narrows could accommodate either submarine cables or overhead lines strung between towers on artificial islands.

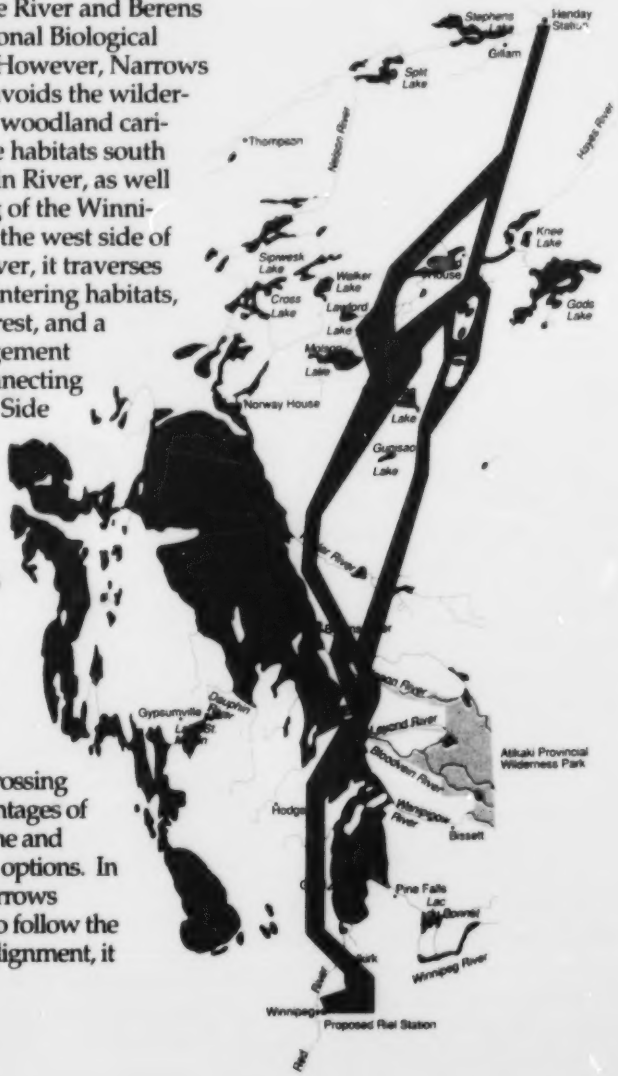
Evaluation

The Narrows option meets Hydro's requirements for physical separation from Bipoles I and II. However, it introduces new reliability concerns in the event that line repairs are required. If an overhead line were installed, maintenance and repair would be limited to ice-free and safe-ice periods at the Narrows. The submarine crossing option would require electrical system studies to confirm its compatibility with the Manitoba Hydro supply system.

A submarine crossing would also be more costly than an overhead line. Depending on the corridor chosen, an overhead crossing could range from approximately $60 million to $160 million (year 2000 dollars), while a submarine crossing could be $190 million to $410 million. While overhead and submarine crossing methods are technically feasible, both are more costly and complex than conventional options in terms of design and construction. The Narrows alternative, therefore, is substantially more expensive than east side options.

Both crossing methods also are associated with potentially significant biophysical impacts, both during and after construction. Moreover, like other alternatives, the eastern segment of this corridor crosses the proposed Hayes Heritage River and Berens River International Biological Program site. However, Narrows Crossing also avoids the wilderness areas and woodland caribou and moose habitats south of the Bloodvein River, as well as any crossing of the Winnipeg River. On the west side of the lake, however, it traverses moose over-wintering habitats, a provincial forest, and a wildlife management area before connecting with the West Side corridor. It risks potential land use conflicts with several existing settlements and, like West Side, would require a Red River crossing north of Winnipeg.

Narrows Crossing shares the advantages of the East Shoreline and Atikaki By-pass options. In particular, if Narrows Crossing were to follow the East Shoreline alignment, it would minimize the extent of woodland caribou range traversed by Bipole III. Narrows Crossing also can minimize intrusion into highly-valued recreation areas and territories marketed for their wilderness experience.



The Preferred Alternative

After evaluation of the alternative corridors, Manitoba Hydro has concluded that the three east side corridors best meet Hydro's siting criteria. They offer superior opportunities to maximize security of the province's power transmission system, while minimizing cost and the need for special engineering and construction measures. And they involve less potential conflict with agricultural and rural residential development in the southern zone of the study area.

The east side options intrude, however, into extensive areas of wilderness, especially north of the Wanipigow River. While not a pristine natural wilderness, this region has been relatively untouched by human activity. To the extent that this region may become marginally more accessible to local people and visitors as a result of Bipole III, its wilderness character may be affected, depending to some extent on which corridor alternative is selected.

In recognition of the value attached by many to wilderness areas, particularly to the Atikaki Park, the Uplands alternative is seen as less desirable than the other two east side options.

Both of the remaining east-side alternatives, Atikaki By-pass and East Shoreline, would permit avoidance of Atikaki Park. However, East Shoreline is longer than the Atikaki By-pass alternative and may involve a construction cost penalty because of the incidence of poorly drained terrain. Subject to more detailed research and analysis, Hydro considers East Shoreline to be technically and economically less attractive than Atikaki By-pass and, for that reason, has tentatively concluded that Atikaki By-pass is the preferred general location for the corridor.

The Preferred Corridor

More detailed study will be undertaken, particularly on the Atikaki By-pass and East Shoreline alternatives, to better define their technical characteristics and to verify routing options in sensitive locations. This may result in refinement of the boundaries of the preferred corridor to take full advantage of the relative opportunities associated with each of the alternatives. Manitoba Hydro will conduct public consultations with a variety of individuals and organizations to receive their comments respecting the alternative corridors and the Atikaki By-pass preference.

The boundaries of the preferred corridor may be refined following more detailed studies.

Manitoba Hydro has requested provincial and federal government authorization to develop the Conawapa-Winnipeg Transmission Complex.

Regulatory Process

Before such approval can be granted, Hydro must submit siting or routing studies, as applicable, and environmental impact assessments for all project components, including the Bipole III HVDC transmission line. The first stage HVDC corridor selection document and supporting materials are expected to be submitted to the governments in early 1992.

A joint federal/provincial Environmental Review Panel has been established to undertake the regulatory review and to conduct public hearings on the Conawapa-Winnipeg Transmission Complex. This Panel is responsible for making recommendations to the provincial and federal governments. Before any construction work can begin, the formal approvals of the Manitoba Minister of Environment and his federal counterpart are required.

Following public consultation on the Bipole III transmission line, Hydro will complete its corridor selection study and request first-stage regulatory approval for the preferred corridor. Once this approval is obtained, Hydro will identify and evaluate alternative line routes within the selected corridor. Further public consultation will be held during the route selection and environmental impact assessment study process. Final documents will be submitted to the joint Panel for review and public hearings during the second stage approval and licensing process.

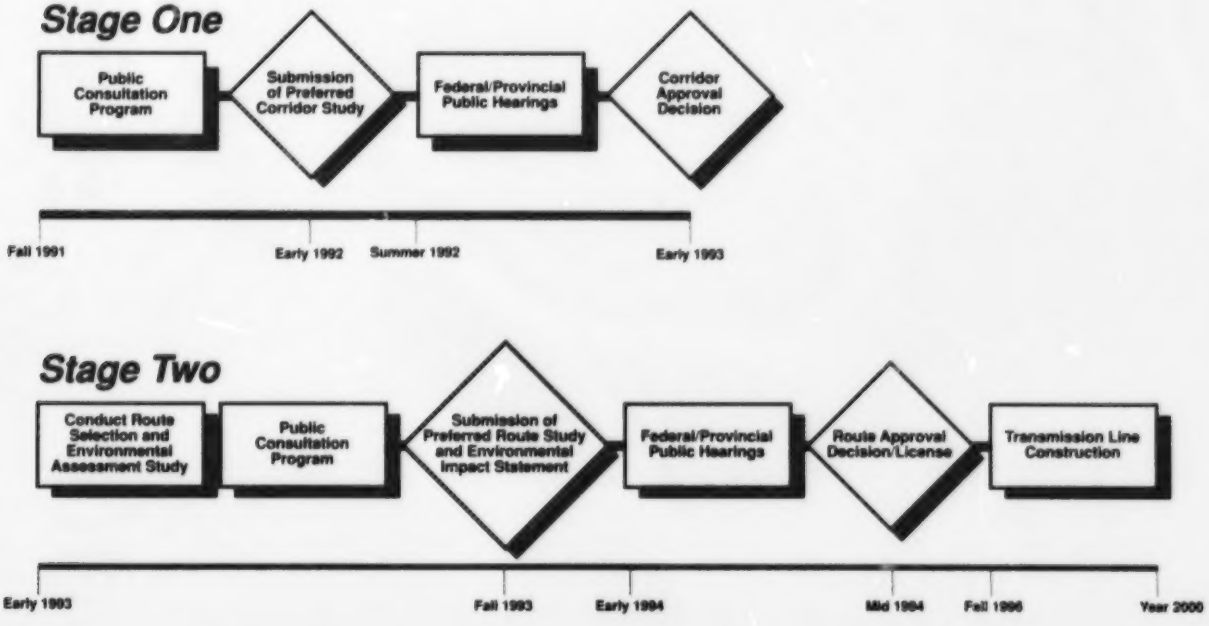
Public Consultation and Comment

Throughout this regulatory process, members of the public will have a series of opportunities to make their voices heard. The open houses, planned to begin in the fall of 1991, represent the most important current opportunity for interested parties to provide Hydro with their views and suggestions before the final Bipole III HVDC Transmission Line Corridor Selection Study is completed.

Once that document is submitted to the Manitoba-Canada Panel, it will be available to all persons in preparation for public hearings on the project. Anyone may appear before the Panel in support of, or in opposition to, Hydro's proposals.

Manitoba Hydro looks forward to discussing this project with you.

Meetings and open houses will be held to provide information and opportunities for public comment on the Bipole III transmission line.



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